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| 08/881,948 | 06/25/1997 | DAVID P. STRAUSS | MRCO2/401F/2 | 3603 |

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EXAMINER

MCDONALD, RODNEY GLENN

ART UNIT

PAPER NUMBER

1753

DATE MAILED: 08/01/2003

26

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

08/881,948

Applicant(s)

STRAUSS ET AL.

Examiner

Rodney G. McDonald

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-13, 23 and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-13, 23 and 24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- ☐ Interview Summary (PTO-413) Paper No(s) _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other:

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Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7-3-03 has been entered.

Claim Rejections - 35 USC § 112

Claims 9-13, 23 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 is indefinite because the phrase "said disk-shaped section having at least one radially-inward step proximate said outer periphery" repeats in lines 5-7. Also in line 5 of claim 9 "radially" is misspelled as "radically".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 9 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujitsu (Japan 59-179784) in view of Lester et al. (U.S. Pat. 3,630,881) and Zejda (U.S. Pat. 5,112,467).

Fujitsu teach in a sputtering device for forming thin film on a substrate by applying direct current of high voltage on the target in a magnetron, the target is attached to a water cooling backing plate by screws with a metal sheet between them. (See abstract)(Applies to claims 9 and 23)

In Figure 2, the target 11 has a generally disk shaped surface having two planar surfaces and a cylindrical outer periphery manufactured of sputtering material. The target has at least one radially-inward step proximate the outer periphery as seen in Figure 2. The target is manufactured of a single material. Holes are provided in proximity to the targets outer periphery to allow screws to attach the target to the backing plate. (See Figure 2)(Applies to claims 9 and 23)

The differences between Fujitsu and the present claims is that the adapter is not discussed and the threaded holes in the target are not discussed.

Lester et al. teach an adapter as seen in Figure 1. In Figure 1 a continuous ring 28 is releasably fixed and spring mounted to a flange 29 on the top plate 13 and

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provides sufficient sealing against the backside of the target 19 via controllable compression of an O-ring 32 housed in an annular groove 33 in the lower surface of the ring 28. An inwardly projecting flange 30 of the ring 28, which has a smaller inner diameter than the outer diameter of body 31 of the cathode 18, serves as a physical stop for the cathode 18 upon insertion into the target assembly. Accordingly, when the cathode body 31 rests on the flange 30 of the ring 28, the physical dimension of the space 27 is repeatedly and reliably controlled and the liquid metal or metallic paste is thus given complete confinement within the space 27. (Column 4 lines 1-15)

The motivation for utilizing an adapter is that it allows to stop the cathode and hold the cathode in place as well as seal the outer side of the cathode from the interior of the coating chamber. (Column 4 lines 1-15; Figure 1)

Zejda teach a cathode sputtering apparatus provided with a quick disconnect mechanism for rapid replacement of a target. (See Abstract)(Applies to claims 9 and 23)

In Fig. 1 there is illustrated an upper portion 19 of a cathode chamber on which is received an annular target unit. As illustrated, the target unit comprises a target 1 and a target base plate 2, the base plate 2 serving as a target holder. (Column 2 lines 59-65)(Applies to claims 9 and 23)

The target 1 and base plate 2 are secured together by means of screw bolts 14. The upper portion 19 essentially comprises the cover of the cathode chamber. (Column 2 lines 66-68) From Fig. 1 threaded holes are provided in order for the threaded screw to secure the target to the holder. (See Fig. 1)(Applies to claims 9 and 23)

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The motivation for utilizing screws to secure a target is that it is desired to provide a target with rapid replacement. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a target having a generally disk-shaped section having two generally planar surface and an outer periphery, the generally disk-shaped section having at least one radially-inward step proximate the outer periphery, manufactured out of a single material, and providing holes in the outer periphery of the target as taught by Fujitsu, to have provided an adapter with a groove and o-rings as taught by Lester et al. and to have provided threaded holes in a target so screws can secure the target to a holder as taught by Zejda because it is desired to stop the cathode and hold the cathode in place as well as seal the outer side of the cathode from the interior of the coating chamber and to provide to provide a target which can be replaced rapidly.

Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujitsu in view of Lester et al. and Zejda as applied to claims 9 and 23 above, and further in view of Inoue (U.S. Pat. 5,244,556).

The differences not yet discussed is exposing one side of the target to vacuum pressure while the other side is not exposed to vacuum pressure and the materials of the sputtering target.

Inoue teach in Fig. 2 an example of target in which solder, a brazing filler metal having a low melting point is not used. Referring to Fig. 2, the target plate 31 is directly mounted on the flange 3a of the support frame 3b by respective screws 17a and 17b via

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the sealing member 4 (the O-ring). Thus, the target plate 31 is directly cooled by cooling water (the heat exchanging medium). (Column 2 lines 31-37)(Applies to claims 10-13)

Inoue also suggest that target materials for a target can be aluminum, one of the metals titanium, zirconium, tungsten, molybdenum, gold, tantalum, niobium, palladium, manganese, silver, zinc, ruthenium, and tellurium, an alloy in which at least one of the above metals is the chief ingredient, chromium, nickel, a chromium alloy, a nickel alloy, magnetic metals such as permalloy, a silicon alloy of one of the metals titanium, tungsten and molybdenum, silicon, and an oxide of any of the above materials. (Column 7 lines 62-68; Column 8 lines 1-5)(Applies to claims 10-13)

The motivation for exposing one side of the target to vacuum pressure and the other side not being exposed to vacuum pressure is that it is desired to directly cool the target and the motivation for forming a target out of different materials is that it is desired to sputter different materials on a substrate. (Column 2 lines 31-37; Column 7 lines 62-68; Column 8 lines 1-5)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to expose one side of a target to a vacuum while the other side is not exposed to a vacuum and to have made a target out of different materials as taught by Inoue because it is desired to cool a target and deposit different materials on a substrate.

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Claims 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujitsu in view of Lester al. and Zejda as applied to claims 9 and 23 above, and further in view Wegmann et al. (GB 2,173,217).

The differences not yet discussed are two radially inward steps in the target.

Wegmann teach in Fig. 5 a target plate 1 having on its outer periphery a cooling lip 12 with which may be associated holding means. Additionally are provided further cooled clamping rings 14 of a smaller diameter the cooling surfaces of which bear onto a cooling rib 15 on the lower side of the target plate 1. (Page 2 lines 52-61)(Applies to claim 24)

The motivation for providing two stepped surfaces on a target surface is that it is desired to cool the target. (Page 2 lines 52-61)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided two stepped surfaces as taught by Wegmann et al. because it is desired to cool the target.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 703-308-3807. The examiner can normally be reached on M- Th with Every other Friday off..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 703-308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9310 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
July 29, 2003